

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-213
Relating to Exemptions Under Section 27156
of the Vehicle Code

VORTECH ENGINEERING, INC.
MODEL V-1 SUPERCHARGER

Pursuant to the authority vested in the Air Resources Board by Section 27156 of the Vehicle Code; and

Pursuant to the authority vested in the undersigned by Sections 39515 and 39516 of the Health and Safety Code and Executive Order G-45-5;

IT IS ORDERED AND RESOLVED: That the installation of the add-on supercharger kit model number V-1, manufactured by Vortech Engineering Inc., of 5273 Commerce Ave., Unit 10, Moorpark, CA 93021, has been found not to reduce the effectiveness of the applicable vehicle pollution control system and, therefore, is exempt from the prohibitions of Section 27156 of the Vehicle Code for 1986-1990 model-year Ford Motor Company passenger cars powered by a 302 CID (5.0L) electronic fuel injection engine.

This Executive Order is valid provided that installation instructions for this supercharger kit will not recommend tuning the vehicle to specifications different from those submitted by Vortech Engineering, Inc.

Changes made to the design or operating conditions of the supercharger kit, as exempt by the Air Resources Board, which adversely affect the performance of a vehicle's pollution control system shall invalidate this Executive Order.

Marketing of this supercharger kit using any identification other than that shown in this Executive Order or marketing of this supercharger kit for an application other than those listed in this Executive Order shall be prohibited unless prior approval is obtained from the Air Resources Board. Exemption of the supercharger kit shall not be construed as exemption to sell, offer for sale, or advertise any component of the kit as an individual device.

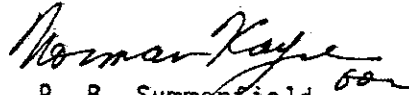
This Executive Order does not constitute any opinion as to the effect the use of this supercharger kit may have on any warranty either expressed or implied by the vehicle manufacturer.

THIS EXECUTIVE ORDER DOES NOT CONSTITUTE A CERTIFICATION, ACCREDITATION, APPROVAL, OR ANY OTHER TYPE OF ENDORSEMENT BY THE AIR RESOURCES BOARD OF CLAIMS OF THE APPLICANT CONCERNING ANTI-POLLUTION BENEFITS OR ANY ALLEGED BENEFITS OF THE VORTECH ENGINEERING, INC. SUPERCHARGER KIT MODEL NO. V-1.

No claim of any kind , such as "Approved by the Air Resources Board" may be made with respect to the action taken herein in any advertising or other oral or written communication.

Violation of any of the above conditions shall be grounds for revocation of this order. The order may be revoked only after ten day written notice of intention to revoke the order, in which period the holder of the order may request in writing a hearing to contest the proposed revocation. If a hearing is requested, it shall be held within ten days of receipt of the request and the order may not be revoked until a determination after hearing that grounds for revocation exist.

Executed at El Monte, California, this 27th day of February, 1991.


R. B. Summerfield
Assistant Division Chief
Mobile Source Division

State of California
AIR RESOURCES BOARD

EVALUATION OF VORTECH ENGINEERING, INC. MODEL V-1 SUPERCHARGER
FOR EXEMPTION FROM THE PROHIBITIONS OF VEHICLE
CODE SECTION 27156 IN ACCORDANCE WITH SECTION 2222, TITLE 13, OF THE
CALIFORNIA CODE OF REGULATIONS

February 1991

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by

Mobile Source Division
State of California
Air Resources Board
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El Monte, CA 91731-2990

(This report has been reviewed by the staff of the California Air Resources Board and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Air Resources Board, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.)

SUMMARY

Vortech Engineering, Inc., of 5273 Commerce Ave., Unit 10, Moorpark, CA. 93021 has applied for an exemption from the prohibitions in Section 27156 of the California Vehicle Code (VC) for the Vortech V-1 Supercharger. The V-1 Supercharger is designed for installation on 1986-90 Ford Motor Company vehicles powered by a 5.0 liter EFI engine.

Previously, the Air Resources Board has exempted the Paxton Supercharger, model number SN-89, with a similar design to the Vortech V-1 Supercharger. Based on the engineering evaluation of the Vortech V-1 Supercharger and a comparative analysis with the Paxton Supercharger, the staff believes that the Vortech V-1 Supercharger will not have any adverse effect on emissions of the affected vehicles. The staff recommends the Vortech V-1 Supercharger be exempted from the prohibitions in VC Section 27156 and that Executive Order D-213 be issued.

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I. INTRODUCTION

Vortech Engineering, Inc., of 5273 Commerce Ave., Unit 10, Moorpark, CA. 93021 has applied for an exemption from the prohibitions in Section 27156 of the California Vehicle Code for the Vortech V-1 Supercharger. The V-1 Supercharger is designed for installation on 1986-90 Ford Motor Company vehicles powered by a 5.0 liter EFI engine.

II. CONCLUSIONS

Previously, the Air Resources Board exempted the Paxton Supercharger, model SN-89, with the same basic design, operating principles and application as the Vortech V-1 Supercharger. The Paxton system was tested and found not to reduce the effectiveness of the pollution control system of the applicable vehicle. Based on a comparative evaluation of the two superchargers, the staff believes the Vortech V-1 Supercharger will not have any adverse effect on exhaust emissions.

III. RECOMMENDATION

The staff recommends, on the basis of similarities, that the Vortech V-1 Supercharger be exempted from the prohibitions in Vehicle Code Section 27156 and that Executive Order D-213 be issued.

IV. DEVICE DESCRIPTION

The Vortech supercharger kit is specifically designed for installation on 1986-90 Ford Motor Company passenger cars powered by a 302 CID EFI engine. The kit operates in conjunction with the original equipment manufacturer (OEM) computer controlled electronic port fuel injection and emission control systems already certified with the stock engine. The purpose of supercharging an engine is to increase the volumetric efficiency of the engine by forcing more air into the engine than it would consume in normal aspirated, non-supercharged condition. This is accomplished by the addition of a centrifugal blower, Vortech Model No. V-1, which delivers an overall impeller-to-crankshaft ratio of 6.21:1. Intake air is delivered from the OEM air filtering system to the centrifugal blower. It is then compressed by the supercharger and routed to the throttle body of the electronic fuel injection system. Maximum positive manifold pressure or boost is limited to 5 psi by the blower scroll housing and the impeller design. No wastegate or other active boost limiting device is used.

To provide additional fuel to maintain the proper air/fuel ratio during boost conditions a fuel control unit is added. At boost, a positive pressure of about 1 psi induced by the supercharger causes an increase in the static pressure in the fuel return line beyond the maximum 34 psi of the OEM fuel pressure regulator. The fuel control unit has a set static pressure limit of 70 psi. This condition causes an increase in air and fuel charge, while maintaining the proper air/fuel ratio.

The blower is lubricated by feed lines in engine block and oil pan. All OEM emission controls are left intact.

V. DISCUSSION

Based on the technical data submitted, the following comparison of the Paxton and Vortech Supercharger systems were made.

1. Both have same inlet and outlet dimensions.
2. Impellers are of identical type and dimension.
3. Impeller-to-crankshaft ratio are the same.
4. At the same impeller RPM, the Vortech supercharger and the Paxton supercharger will deliver the same amount of boost.
5. Both mount in the same location with identical hardware.

The major difference is the internal drive system. While the Paxton supercharger uses a planetary ball drive, the Vortech supercharger uses a gear step-up drive system. Vortech claims its system has less parasitic drag which may even cause less NOx emissions compared to that of Paxton.

Based on the above mentioned similarities, the staff has determined that the Vortech V-1 Supercharger will exhibit similar emission characteristics as the Paxton Supercharger. The Paxton Supercharger has previously been tested using a 1989 Ford Mustang, 5.0 liters, EFI and was determined not to reduce the effectiveness of the emission control system on the affected vehicles. In view of the similar design characteristics of the two superchargers, staff concludes that the Vortech V-1 Supercharger will not have any adverse effects on emissions of 1986-90 Ford Vehicles powered by a 5.0 liter, EFI engine.

APPENDIX B: